

Remarks

Applicants respectfully request reconsideration of the present application in view of the following remarks. Claims 1-12, 48-60, 64-66, and 69-78 are pending in the application. No claims have been allowed. Claims 1, 5, 48, 69, 70, and 71 are independent. Claims 1, 5, 48, 69, 70, and 71 have been amended.

Interview Summary

Applicant thanks the Examiner for his time during the telephone interview on May 29, 2009. The following language of claim 1 was discussed, “jointly coding the value for the switch code with motion vector information for the set of pixels, wherein a single variable length code represents the value for the switch code and the motion vector information, the single variable length code being selected from a table of different value combinations for the switch code and the motion vector information.” Applicant argued that the Puri patent (U.S. Patent No. 5,227,878) does not teach or suggest this language because the Puri patent describes separately encoding information and using separate codes in an output bitstream (See discussion in Amendment filed 4/15/2009, Section I.B). The Examiner agreed to conduct a new search. (See June, 8, 2009, Interview Summary).

Cited Art

The Action applies the following cited art: Puri et al., U.S. Patent No. 5,227,878 (Puri or the Puri patent); Sugimoto et al., U.S. Patent No. 5,650,829 (Sugimoto or the Sugimoto patent); Kimura et al., U.S. Patent No. 5,694,173 (Kimura or the Kimura patent); Shimoda et al., U.S. Patent No. 5,734,783 (Shimoda or the Shimoda patent); Tsukagoshi et al., U.S. Patent Application 2002/0106025 (Tsukagoshi or the Tsukagoshi publication); and Machida, U.S. Patent No. 7,486,734 (Machida or the Machida patent).

Claim Rejections under 35 U.S.C. § 103

In the Office action, the Examiner rejects claims 1-3, 5-6, 11-12, 48, 51-53, 55, 69-71, and 74-78 under 35 U.S.C. § 103(a) as being unpatentable over the Machida patent in view of the Kimura patent. The Applicants respectfully disagree.

Claim 1

Claim 1 recites (emphasis added):

jointly coding the value for the switch code with motion vector information for the set of pixels, wherein a single variable length code represents the value for the switch code and the motion vector information, the single variable length code being selected from a variable length code table of different value combinations for the switch code and the motion vector information.

Regarding the amendments to claim 1, see the Application at pages 23-25 and 38-40.

Machida and Kimura, separately or in combination, do not teach or suggest the above-cited language of claim 1.

According to claim 1, an encoder encodes a set of pixels (e.g., a block, a macroblock). As part of the encoding, the encoder determines a value for a switch code. The value for the switch code indicates whether the set of pixels is intra-coded. The encoder jointly codes the values for the switch code with motion vector information (e.g., differential motion vector information) for the set of pixels. A single variable length code represents the value for the switch code and the motion vector information, where the single variable length code is selected from a variable length code table of different value combinations for the switch code and the motion vector information. For example, the variable length code table has different values combinations for <intra, MVx, MVy>, or it has different values combinations for <intra, MVx, MVy , last>. See, e.g., application at 24-25 and 38-40. The encoder outputs the single variable length code in a bit stream.

The Examiner argues that Machida describes, “jointly coding the value for the switch code with motion vector information for the set of pixels, wherein a single variable length code represents the value for the switch code and the motion vector information,” as recited by claim 1. Specifically, the Examiner argues that Machida determines the value of a switch code (Machida Fig. 3, element 304 inter/intra type control signal) and values for motion vector information (Machida Fig. 3, elements 301 and 313), and then outputs a single variable length code for this information (Machida col. 8, line 64 to col. 9, line 5). Action, page 3. Applicants respectfully disagree with the Examiner’s interpretation of Machida.

Machida describes an intra/inter coding decision (304) for a macroblock. Machida, col. 8, lines 59-64. The result of the decision (the intra/inter control signal) is input into the variable length coder (307) along with motion vectors A and B. Machida, col. 8, line 64 to col. 9, lines 3.

As Machida states, “In the variable length coding means 307, the intra/inter control signal, and motion vector A and motion vector B are also entered, *and are coded into variable length codes*. The variable length coding means 307 *multiplexes all these variable length codes*, and issues as a bit stream.” Machida, col. 8, line 67 to col. 9, lines 5 (emphasis added). As Machida clearly states, the intra/inter signal, motion vector A, and motion vector B are *coded as separate variable length codes*, which are then multiplexed in the bitstream. Specifically, Machida states that the three elements are coded into variable length codes (plural), and that “all these variable length codes” (plural once again) are multiplexed into the bitstream.

Because Machida describes coding the intra/inter signal, and the two motion vectors, as separate variable length codes, Machida clearly does not teach or suggest the language of claim 1 that requires, “*jointly coding* the value for the switch code with motion vector information for the set of pixels, wherein *a single variable length code* represents the value for the switch code and the motion vector information, the single variable length code being selected from a variable length code table of different value combinations for the switch code and the motion vector information.” The encoding of Machida does not jointly code the intra/inter signal, motion vector A, and motion vector B elements, and therefore the encoding of Machida does not use a single variable length code for them. Instead, Machida’s encoding codes them separately and sends them in the bit stream (*multiplexes “all these variable length codes,”* referring to the intra/inter signal, motion vector A, and motion vector B).

In addition, as understood by Applicants, Kimura does not teach or suggest, “*jointly coding* the value for the switch code with motion vector information for the set of pixels, wherein a single variable length code represents the value for the switch code and the motion vector information, the single variable length code being selected from a variable length code table of different value combinations for the switch code and the motion vector information,” as recited by claim 1.

For at least the above reasons, Machida and Kimura, separately or in combination, do not teach or suggest the above-cited language of claim 1. Therefore claim 1 should be in condition for allowance.

Claims 5 and 70

Claim 5 recites:

jointly coding the value for the switch code with motion vector information for the set of pixels and with a terminal symbol indicating whether transform coefficient data is encoded for the set of pixels, wherein the jointly coding yields an extended motion vector code that is a single variable length code representing (a) the value for the switch code, (b) the motion vector information and (c) the terminal symbol, the single variable length code being selected from a variable length code table of different value combinations for the switch code, the motion vector information and the terminal symbol.

Claim 70 recites:

means for encoding an extended motion vector code for a set of pixels, wherein the extended motion vector code reflects joint encoding of motion information together with intra/inter decision information indicating whether the set of pixels is intra-coded or inter-coded and with a terminal symbol, wherein the terminal symbol indicates whether subsequent data for the set of pixels is included in the encoded bit stream, and wherein the extended motion vector code is a single variable length code representing (a) the intra/inter decision information, (b) the motion information and (c) the terminal symbol, the single variable length code being selected from a variable length code table of different value combinations for the intra/inter decision information, the motion information and the terminal symbol.

Claims 5 and 70 have been amended similarly to claim 1 above.

For at least the reasons discussed above with regard to the above-cited language of claim 1, Machida and Kimura, separately or in combination, do not teach or suggest the above-cited language of claims 5 and 70, respectively.

In addition, Machida and Kimura, separately or in combination, do not teach or suggest the language of jointly coding the additional “terminal symbol” as recited by claims 5 and 70.

Therefore claims 5 and 70 should be in condition for allowance.

Claims 48, 69, and 71

Claim 48 recites:

decoding an extended motion vector code for the set of pixels, wherein the extended motion vector code reflects joint encoding of motion information together with intra/inter decision information indicating whether the set of pixels is intra-coded or inter-coded and with a terminal symbol, wherein the extended motion vector code is a single variable length code representing (a) the intra/inter decision information, (b) the motion information and (c) the terminal symbol, and wherein the decoding the extended motion vector code uses a variable length code table of different value combinations for the intra/inter decision information, the motion information and the terminal symbol.

Claim 69 recites:

means for decoding an extended motion vector code for a set of pixels, wherein the extended motion vector code reflects joint encoding of motion information together with intra/inter decision information indicating whether the set of pixels is intra-coded or inter-coded and with a terminal symbol, wherein the extended motion vector code is a single variable length code representing (a) the intra/inter decision information, (b) the motion information and (c) the terminal symbol, and wherein the decoding the extended motion vector code uses a variable length code table of different value combinations for the intra/inter decision information, the motion information and the terminal symbol.

Claim 71 recites:

decoding an extended motion vector code for the set of pixels, wherein the extended motion vector code reflects joint encoding of motion vector information together with intra/inter decision information indicating whether the set of pixels is intra-coded or inter-coded and with a terminal symbol, wherein the extended motion vector code is a single variable length code representing (a) the intra/inter decision information, (b) the motion vector information and (c) the terminal symbol, and wherein the decoding the extended motion vector code uses a variable length code table of different value combinations for the intra/inter decision information, the motion vector information and the terminal symbol.

Claims 48, 69, and 71 have been amended similarly to claim 1 above.

For at least the reasons discussed above with regard to the above-cited language of claims 1, 5, and 70, Machida and Kimura, separately or in combination, do not teach or suggest the above-cited language of claims 48, 69, and 71, respectively. Therefore claims 48, 69, and 71 should be in condition for allowance.

Furthermore, regarding claim 48 (Action, page 5), the Examiner cites to columns and lines of a Machida that are not present in Machida (e.g., col. 12, lines 60-67 and col. 15). It appears that these cites are from the prior rejection using the Puri patent (see Dec. 12, 2008, Office action).

Claims 2, 3, 6, 11, 12, 51-53, 55, and 74-78

Each of dependent claims 2, 3, 6, 11, 12, 51-53, 55, and 74-78 depends directly or indirectly on one of claims 1, 5, 48 and 71 and, therefore, should also be allowable. The Applicants will not belabor the merits of the separate patentability of these dependent claims

Claims 4, 50, and 73

In the Office action, the Examiner rejects claims 4, 50, and 73 under 35 U.S.C. § 103(a) as being unpatentable over the Machida patent in view of the Kimura patent and in further view of the Shimoda patent. The Applicants respectfully disagree.

Claim 4 depends on claim 1, claim 50 depends on claim 48, and claim 73 depends on claim 71. The Machida patent and the Kimura patent, taken separately or in combination, fail to teach or suggest the above-cited language of claims 1, 48, and 71, respectively. The Shimoda patent fails to remedy this deficiency of the rejections. Although the Shimoda patent describes variable length coding and decoding as part of video coding/decoding system, it does not address variable length coding and decoding of motion vector information or other motion information, and it is even further from teaching or suggesting the joint coding or corresponding decoding recited in claims 1, 48, and 73, respectively.

For at least this reason, claims 4, 50, and 73 should be allowable. The Applicants will not belabor the merits of the separate patentability of these dependent claims.

Claim 9

In the Office action, the Examiner rejects claim 9 under 35 U.S.C. § 103(a) as being unpatentable over the Machida patent in view of the Sugimoto patent. The Applicants respectfully disagree.

Claim 9 depends on claim 1. The Machida patent and the Sugimoto patent, taken separately or in combination, fail to teach or suggest the above-cited language of claim 1. As explained above with regard to claim 1, the Machida patent fails to teach or suggest the above-cited language of claim 1. The Sugimoto patent fails to remedy this deficiency of the rejection. Although the Sugimoto patent describes motion vector detection and compression, with an emphasis on different ways of performing motion vector detection, it does not detail coding and decoding of motion vector information or other motion information, and it is even further from teaching or suggesting the joint coding language recited in claim 1.

For at least this reason, claim 9 should be allowable. The Applicants will not belabor the merits of the separate patentability of this dependent claim.

Claims 49 and 72

In the Office action, the Examiner rejects claims 49 and 72 under 35 U.S.C. § 103(a) as being unpatentable over the Machida patent in view of the Tsukagoshi publication. The Applicants respectfully disagree.

Claim 49 depends on claim 48, and claim 72 depends on claim 71. The Machida patent and the Tsukagoshi publication, taken separately or in combination, fail to teach or suggest the above-cited language of claims 48 and 71, respectively. As discussed above, the Machida patent fails to teach or suggest the above-cited language of claims 48 and 71, respectively. The Tsukagoshi publication fails to remedy this deficiency of the rejections. Although the Tsukagoshi publication describes aspects of a video decoding system, it does not address variable length coding and decoding of motion vector information or other motion information, and it is even further from teaching or suggesting decoding of a code that reflects joint encoding as recited in claims 48 and 71, respectively.

For at least this reason, claims 49 and 72 should be allowable. The Applicants will not belabor the merits of the separate patentability of these dependent claims.

Claims 65 and 66

In the Office action, the Examiner rejects claims 65 and 66 under 35 U.S.C. § 103(a) as being unpatentable over the Machida patent in view of features “well-known in the art” according to the Examiner. The Applicants respectfully disagree.

As a threshold matter, the Applicants respectfully disagree with the Examiner’s use of Official Notice in the rejections. In any case, each of claims 65 and 66 depends on claim 48. As discussed above, the Machida patent fails to teach or suggest the above-cited language of claim 48. The features that the Examiner cites as being well-known in the art do not relate to variable length coding and decoding of motion information, and they are even further from teaching or suggesting decoding of a code that reflects joint encoding as recited in claim 48.

For at least this reason, claims 65 and 66 should be allowable. The Applicants will not belabor the merits of the separate patentability of these dependent claims.

Claims 7, 8, 10, 54, 56-60, and 64

In the Office action, the Examiner rejects claims 7, 8, 10, 54, 56-60, and 64 under 35 U.S.C. § 103(a) as being unpatentable over the Machida patent in view of the Kimura patent and in further view of the Puri patent. The Applicants respectfully disagree.

Claims 7, 8, and 10 depend on claim 5, and claims 54, 56-60, and 64 depend on claim 48. The Machida patent and the Kimura patent, taken separately or in combination, fail to teach or suggest the above-cited language of claims 5 and 48, respectively. The Puri patent fails to remedy this deficiency of the rejections. Generally, the Puri patent describes (a) a block classification signal that includes an inter/intra coding type signal, (b) differential motion vector components and (c) a one-bit macroblock_code_nocode flag, but these elements are separately sent to an encoder and multiplexer for transmission as different syntax elements in an output bit stream.

For at least this reason, claims 7, 8, 10, 54, 56-60, and 64 should be allowable. The Applicants will not belabor the merits of the separate patentability of these dependent claims.

Interview Request

If the claims are not found by the Examiner to be allowable, the Examiner is requested to call the undersigned attorney to set up an interview to discuss this application.

Conclusion

The claims should be allowable. Such action is respectfully requested.

Respectfully submitted,

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